UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,570	01/14/2004	Man-Ho Lawrence Lee	200312986-1	5924

			EXAMINER
22879	7590	11/27/2006	CONTINO, PAUL F

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ART UNIT	PAPER NUMBER
2114	

DATE MAILED: 11/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/758,570	LEE ET AL.
	Examiner	Art Unit	
	Paul Contino	2114	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>25 October 2006</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-6,14 and 16* is/are allowed.

6)☒ Claim(s) *7,8,10-13,17-21 and 23-27* is/are rejected.

7)☒ Claim(s) *22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION: Final Rejection

Response to Arguments

1.   Applicant's arguments, see page 9 of the Remarks, filed October 25, 2006, with respect to the 35 USC 102(b) rejections under Jardine et al. with respect to claims 1-6 have been fully considered and are persuasive. The prior art rejections under Jardine et al. of claims 1-6 of August 4, 2006, have been withdrawn.

2.   Applicant's arguments, see pages 9 and 10 of the Remarks, filed October 25, 2006, with respect to the rejections of claims 7-11 and 13 under 35 USC 102(b) under Jardine et al. have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new grounds of rejection is made in view of Wilson et al. and is described below. The scope of claim 7 is interpreted as having changed in light of the cancellation of the language "executable by the processor unit".

3.   Applicant's arguments on page 10 of the Remarks, filed October 25, 2006, with respect to the prior art rejections of claims 23-27 have been fully considered but they are not persuasive. See the prior art rejections below.

4.   Claim 12 has now been rejected in view of newly applied prior art Wilson et al. in response to the amendment of independent base claim 7. Please see the rejection below.

5.   Claim 17 has not been amended to change the scope, and therefore the Jardine et al. and

Lim prior art references stand. Page 10 of the Remarks in the third paragraph states that claim

17 is dependent on claim 14, which is not the case in the Claims themselves. Claims 18-21,

which are dependent on claim 17, are also presently rejected in view of Jardine et al. as further

described in the present Office Action. Claim 22 remains objected to.

Claim Objections

6.   Claim 25 is objected to because of the following informalities: the statement "the

corresponding communication path", where the Examiner is uncertain as to what the particular

communication path corresponds to. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7.   Claims 26 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite

for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention.

Claim 26 recites the limitation "the survival priority" in line 2. There is insufficient

antecedent basis for this limitation in the claim. Claim 27 is rejected based upon its dependency

to claim 26.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on
sale in this country, more than one year prior to the date of application for patent in the United States.

8.   Claims 17, 18, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Jardine

et al. (U.S. Patent No. 5,884,018).

As in claim 17, Jardine et al. discloses a method for regrouping processor units in a fault-

tolerant system, comprising:

determining the ability of each processor unit to communicate with other processor units

in the system *(column 13 lines 28-65)*;

forming at least two candidate groups with the same number of processor units that are

able to communicate with each other *(column 19 line 66 through column 20 line 3, and column

20 lines 54-57)*; and

evaluating connectivity condition scores (CCSs) for each candidate group of the

processor units, wherein each CCS indicates the connectivity condition of one communication

path associated with a corresponding processor unit *(column 19 line 37 through column 20 line 7)*.

As in claim 18, Jardine et al. discloses the CCS is based on the number of connectivity errors experienced by the corresponding communication path *(column 19 lines 43-46)*.

As in claim 20, Jardine et al. discloses the severity of each connectivity error is factored into the corresponding CCS *(column 2 line 47 through column 3 line 20, column 13 lines 46-61, and column 14 lines 59-67, where it is interpreted that a broken link is severe and taken into account when determining a CCS)*.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9.   Claims 7-8 and 10-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Wilson et al. (U.S. Patent No. 7,099,942).

As in claim 7, Wilson et al. discloses a system for fault-tolerant processing, comprising:

a processor unit *(Figure 1 #110)* configurable to communicate with other components in the system via at least two switching fabrics *(Figure 1 #120,130; column 5 lines 8-17)*; and computer instructions stored on a computer readable medium and operable to:

maintain a connectivity condition score (CCS) for each communication path along the at least two fabrics based on connectivity errors experienced on the path *(column 6 lines 26-32, health score)*, wherein the number of connectivity errors during previous observation time periods are factored into a corresponding CCS during an observation time period *(column 5 lines 60-67, column 6 lines 20-23, and column 7 lines 27-35, where it is interpreted that every update of a path element fault is cumulative, and therefor factors in previous fault observations)* and the CCSs are utilized to determine whether the processor unit will continue to be included in the system *(column 7 lines 5-60, where immediate servicing implies that a processor unit will not continue to be included in the system)*.

As in claim 8, Wilson et al. discloses the severity of each connectivity error is factored into the corresponding CCS *(column 6 lines 27-67 and column 10, Tables 1 and 6A)*.

As in claim 10, Wilson et al. discloses the processor unit is further configured to communicate the CCSs to at least one of the other components in the system *(column 7 lines 60-67, where external systems 180 and 190 are interpreted as other components)*.

As in claim 11, Wilson et al. discloses summarizing each set of CCSs into a single score *(column 17 lines 9-48, Table 8)*.

As in claim 12, Wilson et al. discloses normalizing each set of CCSs based on the single score *(column 17 line 66 through column 18 line 5)*.

As in claim 13, Wilson et al. discloses computer instructions executable by the processor unit and operable to: transform the normalized CCSs into a condensed format *(column 17 line 67 through column 18 line 5)*.

*   *   *

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10.   Claims 17-19, 21, 23-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Lim (U.S. Patent No. 6,526,521).

As in claim 17, Lim discloses a method for regrouping processor units in a fault-tolerant system, comprising:

determining the ability of each processor unit to communicate with other processor units

in the system *(column 7 lines 19-27 and 35-36, column 8 lines 9-21, column 10 lines 52-57, and*

column 11 lines 57-61, which discloses a determination of the ability for processing units HOSTs

to communicate with the storage system processor unit 26 via pathway sets 24);

forming at least two candidate groups with the same number of processor units that are

able to communicate with each other *(Fig. 1; column 6 lines 57-64, where HOST A [first*

processing unit] and storage system 26 [second processing unit] is interpreted as one candidate

group with two processing units and HOST B and storage system 26 is interpreted as a second

candidate group also with two processing units, which communicate with one another via link

27); and

evaluating connectivity condition scores (CCSs) for each candidate group of the

processor units, wherein each CCS indicates the connectivity condition of one communication

path associated with a corresponding processor unit *(column 7 lines 19-27 and 35-36, column 8*

lines 9-21, column 10 lines 52-57, and column 11 lines 57-61, where the entirety of a group 24

(i.e. 24-A) is interpreted as a path, and the number of failed links on the path is interpreted as

determining a connectivity condition).

As in claim 18, Lim discloses the CCS is based on the number of connectivity errors

experienced by the corresponding communication path *(column 7 lines 19-27 and 35-36, column*

8 lines 9-21, column 10 lines 52-57, and column 11 lines 57-61, where the number of failed links

[connectivity errors] on a pathway set 24 [communication path] is interpreted as a CCS).

As in claim 19, Lim discloses at least one of the CCSs is based on historical connectivity

errors experienced by the corresponding communication path *(column 7 lines 19-27 and 35-36,*

column 8 lines 9-21, column 10 lines 52-57, column 11 lines 30-61, and column 13 lines 31-34,

where the number of failed links in a pathway set is interpreted as a cumulative count of the

number of errors in a communication path that can occur over a period of time [history]).

As in claim 21, Aoki discloses forming a bi-directional CCS for each processor unit

(column 7 lines 19-27 and 35-36, column 8 lines 9-21, column 10 lines 52-57, and column 11

lines 57-61, where the number of failed links [CCS] per HOST [processor unit] are interpreted

as bi-directional because communication between a HOST and storage system 26 occurs in two

directions [read vs. write]); and

selecting between the at least two candidate groups to include in the system based on the

sum of the bi-directional CCSs for the processor units in each group *(column 16 lines 4-25,*

where HOST X is selected over HOST A in response to the number of link failures [CCS] in a

pathway set 24-A).

As in claim 23, Lim discloses an apparatus for regrouping processor units in a fault-

tolerant system, comprising:

means for forming at least two candidate groups of processor units that are able to

communicate with each other *(Fig. 1; column 6 lines 57-64, where HOST A and storage system*

26 is interpreted as one candidate group and HOST B and storage system 26 is interpreted as a

second candidate group, which communicate with one another via link 27); and

means for evaluating connectivity condition scores (CCSs) for each candidate group of the processor units, wherein the number of connectivity errors during previous observation time periods are factored into a corresponding CCS during an observation time period *(column 7 lines 19-27 and 35-36, column 8 lines 9-21, column 10 lines 52-57, column 11 lines 30-61, and column 13 lines 31-34, where the number of failed links in a pathway set is interpreted as a cumulative count of the number of errors in a communication path that can occur over a period of time (multiple [previous] observation periods))* and each CCS indicates the severity of connectivity errors experienced by one communication path associated with the corresponding processor unit *(column 7 lines 19-27 and 35-36, column 8 lines 9-21, column 10 lines 52-57, and column 11 lines 57-61, where the entirety of a group 24 (i.e. 24-A) is interpreted as a path, and the number of failed links on the path is interpreted as determining the severity of connectivity errors)*; and

means for selecting one of the at least two candidate groups based on the CCSs *(column 16 lines 4-25)*.

As in claim 24, Lim discloses means for counting the number of connectivity errors experienced by the corresponding communication path during an observation period *(column 7 lines 19-27 and 35-36, column 8 lines 9-21, column 10 lines 52-57, column 11 lines 57-61, and column 13 lines 31-34, where the number of failed links in a pathway set is interpreted as a count of the number of errors in a communication path)*.

As in claim 25, Lim discloses means for factoring into the CCS connectivity errors experienced by [a] corresponding communication path during at least one previous observation period *(column 7 lines 19-27 and 35-36, column 8 lines 9-21, column 10 lines 52-57, column 11 lines 30-61, and column 13 lines 31-34, where the number of failed links in a pathway set is interpreted as a cumulative count of the number of errors in a communication path that can occur over a period of time (multiple observation periods))*.

As in claim 26, Lim discloses means for selecting a candidate group based on [a] survival priority of the processor units included in each candidate group *(column 16 lines 4-39, where HOST X is selected in lieu of HOST A)*.

As in claim 27, Wilson et al. discloses means for selecting a candidate group based on the CCSs, when both candidate groups have the highest number of at least one of the group consisting of: processor units and processor units with the highest survival priority *(column 16 lines 35-39, where it is interpreted that if two available hosts have an equivalent survival priority, then only one will be selected to take over for a failed host)*.

Allowable Subject Matter

11.   Claims 1-6, 14, and 16 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

As in claim 1, the inclusion of the limitations relating to **weighted sums of connectivity errors experienced on the communication paths** and **determination of candidate groups,** when read within the remainder of the limitations of the claim, make claim 1 allowable over the prior art. Claims 2-6 are allowed based upon their dependency to claim 1.

As in claim 14, the inclusion of the limitation **a single score representing the sum of the CCSs for the processor unit,** when read within the scope of the remainder of the limitations of the claim, makes claim 14 allowable over the prior art. Claim 16 is allowed based upon its dependency to claim 14.

12.   Claim 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As in claim 22, the inclusion of arbitrarily choosing between candidate groups based on a sum connectivity scores, when read within the scope of the remainder of the limitations of the claim, including base claim 21, makes claim 22 allowable over the prior art.

Conclusion

13.   Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action.   Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action.   In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action.   In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

14.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Paul Contino whose telephone number is (571) 272-3657. The

examiner can normally be reached on Monday-Friday 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PFC
11/13/2006

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